Outline

- Natural gas data
- JODI Gas monthly data collection
- Readings
JODI Gas

Natural gas data
World gas demand steadily increased over last 25 years and is expected to further rise over next two decades.

Natural gas perspective

• The cleanest (or less polluting) fossil fuel, plentiful and dynamic fuel

• Recent increase in trade (LNG), and price volatility
Natural gas production by region

Middle East production of natural gas increased more than 6 times from 1990.

Middle East production of natural gas increased more than 6 times from 1990.

Source: Data coming from IEA website 2018.
Importance of monthly gas data

Natural gas gross inland deliveries in Poland

Million standard cubic meters (mcm)

Source: JODI Database, November 2018.
Importance of monthly gas data

Natural gas gross inland deliveries in Poland

Source: JODI Database, November 2018.
JODI Gas
Monthly data collection
What is Natural Gas?

• “...mixture of gaseous hydrocarbons, primarily methane, but generally also including ethane, propane and higher hydrocarbons... and some non-combustible gases”
What is Natural Gas?

• Natural gas can be mainly found natural in underground reservoirs that can be distinguished as:
  – associated gas (from fields producing both liquid and gaseous hydrocarbons), or
  – non-associated gas (from fields producing only gaseous hydrocarbons)

But includes also colliery gas, coal seam gas, dissolved gas, shale gas
Flows

NATURAL GAS PRODUCTION

Receipts from Other Sources
- Other
- Coal seam & Colliery gas
- Non-associated natural gas (dry)
- Shale gas
- Non-associated natural gas (wet)
- Associated natural gas (wet)

Separation facilities / Gas processing plants
- Crude oil
- NGL

Pipeline Imports / Exports
- Pipeline Imports / Exports
- LNG Imports / Exports

Gross Inland Deliveries
- Transformation sector:
  - Electricity and Heat Generation
- Energy industry own use:
  - Liquefaction/regasification plant – By-product LPG, etc.
- Final consumption:
  - Transportation including International bunker (LNG tanker own use)
  - Industry, Residential, Other

Stocks - build / draw
- Ethane
- Propane
- Butane
- Pentane
- Pentane Plus
Supply - Main flows

• Production
  – (+ receipts/production from other sources)

• Imports and Exports
  – Pipelines and LNG

• Stock changes (closing minus opening stocks)

• Gross Inland Deliveries Observed
## The JODI Gas Questionnaire

<table>
<thead>
<tr>
<th></th>
<th>Natural Gas in million m³ (at 15°C, 760 mm hg)</th>
<th>Natural Gas in Terajoules</th>
<th>Natural Gas (LNG) in 1000 metric tons</th>
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<tbody>
<tr>
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<td>Production</td>
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<td>Receipts from Other Sources</td>
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<td>Pipeline</td>
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<td>Stock Change</td>
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<tr>
<td>Gross Inland Deliveries (Calculated)</td>
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<tr>
<td>Statistical Difference (Calculated)</td>
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<tr>
<td><strong>Gross Inland Deliveries Observed</strong></td>
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<td></td>
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<tr>
<td>of which: Electricity and Heat Generation</td>
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<tr>
<td>Closing stocks</td>
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</tbody>
</table>

### Mass to volume conversion factor of LNG (if you have specific figure)

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<table>
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<tbody>
<tr>
<td>m³/metric ton LNG</td>
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<tr>
<td>Conversion factor</td>
<td></td>
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</tbody>
</table>
Production

- Refers to dry, marketable production within national boundaries including offshore.
- Quantities reinjected, flared and vented *in situ* are excluded.
- NGLs and impurities such as Sulphur are excluded.

- Included quantities used within the natural gas industry.
- Manufactured gases and biogas should be excluded!
Receipts from Other Sources

• Accounts for gases accounted for elsewhere blended into natural gas
• Pure biogases and manufactured gases are excluded
Import and Exports:

- All goods entering or leaving national territory
- Includes both pipeline and LNG tanker trade
- Goods-in-transit should be excluded (difficult to determine in complex pipeline systems)
- Includes re-imports and re-exports
- International bunkers should be excluded
- When LNG is imported, re-gasified and exported, the country should report the quantities as imports and exports.
Stocks

- Reported on a national territory basis
- Exclude gas reserves (unextracted gas)
- Exclude cushion gas
- Pipeline gas and line pack are not included

Stock change = closing stock levels – opening stock levels
Gross Inland Deliveries Observed

• Deliveries to the inland market
• Includes losses in distribution, international marine bunkers and an energy industry’s own use.
• Observed!
Electricity and heat generation

- Deliveries for electricity and heat generation
- Both main activity plants and autoproducers
- Includes own use of the pipeline network
• Though definitions exist, exceptions may still arise
• This may cause differences in reporting, but should be clearly indicated in country notes
• Examples:
  – inclusion of natural gas in transit via pipeline in trade
  – “Receipts from other sources” included with production
  – only main activity producers (or electricity-only plants) included in deliveries to “Electricity and heat generation”
Measurement Units

• Units to be used in reporting
  – Volumetric units: Million m$^3$, standard conditions
  – Energy units: TJ, **gross basis**
  – Mass units: tons [LNG trade only]

• Conversion between energy units and volumetric/mass units may depend on flow

• Calorific value needed if only one unit is reported (but countries are asked to report in both main units)
JODI Gas

Readings
The JODI Gas Manual was prepared to provide:

- **Guidance** on the reporting of the JODI Gas Questionnaire
- **Reference** for concepts and definitions
- **Examples** of data collection validation methods
- Examples of country practices in the collection of JODI Gas data

It is meant to be of use to both compilers and users of monthly gas data.
Preparation Process

• The JODI Gas Manual was drafted by UNSD in close cooperation with JODI partner organizations
• It is the result of a number of technical discussions and rounds of consultation with JODI organizations
• The manual was published in 2013
Data Collection/Compilation

• Guidance on data sources and data collection methods (production data from extraction companies, trade data from customs offices, etc)

• Discussion of treatment of missing data and confidential data

• Brief discussion of benchmarking, the reconciling of monthly and annual data (publishing time lags make this less relevant for JODI)
Country Practices

- Representative cross-section
  - Azerbaijan
  - Brazil
  - Thailand
  - United Kingdom

- **Not** an explicit compilation guide, should not be seen as best practices; more an opportunity to learn from each other
Data Quality

Assess accuracy of the data
  – balance check
  – stocks check
  – calorific value check
  – time series check

Common reporting errors
International Recommendations (IRES)

- All definitions of flows and products are consistent with IRES
- If you need a specific information you can always refer to IRES

https://unstats.un.org/unsd/energy/ires/
Next Steps

• With agreed-upon definitions, the reporting burden on countries is reduced and the transparency of the JODI Gas data should increase

• Better, more transparent data was a pre-requisite to launching the JODI Gas world database at the IEF Ministerial in Moscow, May 2014

• More trainings, continuous improvement
Conclusion

Data quality improvement should never stop!
Annex 1: Conversion between Standard and Normal Conditions

Table A2.5: Conversion equivalents between Standard cubic metres ($m^3$) and Normal cubic metres ($m^3$)

<table>
<thead>
<tr>
<th>From:</th>
<th>To</th>
<th>Standard $m^3$</th>
<th>Normal $m^3$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard $m^3$</td>
<td></td>
<td>1</td>
<td>0.948</td>
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<tr>
<td>Normal $m^3$</td>
<td></td>
<td>1.055</td>
<td>1</td>
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</table>

Note: Standard cubic metre ($m^3$) refers to standard measurement conditions at 15°C and 760 mm Hg. Normal cubic metre ($m^3$) refers to normal measurement conditions at 0°C and 760 mm Hg.
Annex 2: Conversion between LNG and Natural Gas Units

Table A2.6: Conversion equivalents between LNG and Natural Gas units

<table>
<thead>
<tr>
<th>From</th>
<th>Metric Tons of LNG</th>
<th>m$^3$ of LNG</th>
<th>Standard m$^3$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metric Tons of LNG</td>
<td>1</td>
<td>2.2</td>
<td>1360</td>
</tr>
<tr>
<td>m$^3$ of LNG</td>
<td>0.45</td>
<td>1</td>
<td>615</td>
</tr>
<tr>
<td>Standard m$^3$</td>
<td>7.35*10^{-4}</td>
<td>1.626*10^{-3}</td>
<td>1</td>
</tr>
</tbody>
</table>

(a) 1 Standard m$^3$ = 40 MJ.